GSAS v5.2 Release Notes

GSAS Team

January 31, 2006

Introduction

The data dictionary and flag PDFs have been significantly updated.

L1A Changes

None

Altimetry changes

The range correction for saturation is now available for all gains.

When computing noise from the echo there was an error in using compressed samples which has been fixed. Past and current processing use the observed noise so this fix will not effect product results.

An error in the ordering of the load tide correction was fixed. Minor differences in results are seen.

The reference frame for the DEM elevation was changed to the TOPEX/ Poseidon ellipsoid to make it consistent with the GLAS elevations. Previous releases had the SRTM30 elevations referenced to the egm96 geoid.

There were no changes to the standard fitting used for the icesheet elevations. The alternate fitting had changes that for some echos significantly change the detection of peaks.

Alternate fit, when set, now consistently keeps the last peak. It had been found that in some cases alternate fit was not keeping the last peak.

Alternate Fit added option to not refine initial peak estimation based on Saturation index. This release sets the option to refine initial peaks based on saturation index. If Saturation Index is greater then N define a peak by center location and x% of amplitude crossing the leading and trailing edges searching from beginning and end of waveform. If Saturation index is less then N do normal peak definition. For this release N=255.

Alternate fit implemented an adaptive peak selection. When combining close initial peaks, and the number of peaks reaches 6, combining stops. This also means for less then 7 initial peaks it uses the initial peaks. This means the software is determining that, when all 6 peaks are close together, it can change the minimum peak separation.

Windspeed and direction from met files were added to GLA15.

Atmosphere changes

Release 5.2 includes the following additional MET parameters: NCEP model PBL height, 2m specific humidity, 2m temperature and total cloud cover.

A more Accurate aerosol optical depth and extinction for laser 2a data: V5.2 incorporates more accurate extinction to backscatter (S) ratio for aerosols through the use of the NRL aerosol transport model to determine the type of aerosol at a given location. The more accurate S ratio enables a better determination of aerosol optical depth and extinction. The aerosol model data are available globally every 6 hours, but for simplicity, an average for the whole observation period is used. In future releases, we will incorporate a time dependent model.

The 1064 Medium Resolution Cloud detection had an error that occasionally when more than one layer was detected, sometimes, but not always, the second or third layer top and bottom height values were reported as invalid, but the number of layers indicate that there should be a valid layer there. This problem was fixed.

The availability flags in i_MRir_QAflag were incorrectly packed in previous versions such that it did not conform to the documentation. They are now packed correctly as to be consistent with the documentation.

The i_Aer_ir_layflg parameter, which tells how many aerosol layers were detected by the 1064 channel is now included on GLA11.

Product Format/Definition Change Summary

GLA05

added i_numIters i1b (40)

changed i_spare6 i1b(110) to i_spare6 i1b(70)

GLA06

i_satCorrFlg, changed description and the PDF file to reflect added descriptions.

i_DEM_hires_src & i_DEM_hires_elv, updated description and PDF file

i_DEM_elv, changed description.

i_satNrgCorr, changed units to 0.1fJ, Scale to 1.0d-17

i_satPwdCorr, changed units to 0.01ns, scale to .01

i_msRngCorr, added description

i_msCorrFlg, added description

GLA07

changed backscatter product description limits for 532 nm TO (41.1 to -1.0 km).

GLA08

Added new variables i_PBL_Layer_ht i2b (4), i_Spec_Humid i2b (4), i_Temp2mAbvGrnd i2b 4), i_Total_CloudCov i2b (4)

changed i_spare2 i1b (264) to i_spare2 i1b (232)

changed i_Solar_Angle to i_SolarAngle

i_Surface_wind changed description

i_Surface_wdir changed description

i_Spec_Humid changed description

i_LayHgt_Flag - pdf description changed.

GLA09

i_LRCL_Flag & i_MRCL_Flag, changed description in the PDF files

i_FRcld_grd & i_HRcld_grd & i_MRcld_grd & i_LRcld_grd, changed minimum to -127 and changed description

Added new variables i_PBL_Layer_ht i2b (4), i_Spec_Humid i2b (4), i_Temp2mAbvGrnd i2b (4), i_Total_CloudCov i2b (4)

changed i_spare4 i1b (590) to i_spare4 i1b (558)

changed i_Solar_Angle to i_SolarAngle

i_Surface_wind changed description

i_Surface_wdir changed description

i_Spec_Humid changed description

i_FRcld_bot, i_FRcld_top descriptions changed.

GLA10

changed i_Solar_Angle to i_SolarAngle

i_cld1_ext_prof changed Short Description

i_cld1_sval1 changed description

i_aer4_sval1 changed description

i_cld1_sval_uf, i_aer4_sval_uf changed description

i_cld1_bs_flag, i_cld1_ext_flag, i_aer4_bs_flag, i_aer4_ext_flag changed description and the PDF file

i_Surface_wind changed description

i_Surface_wdir changed description

GLA11

changed i_Solar_Angle to i_SolarAngle

Added new variable i_Aer_ir_layflg i1b (2)

changed i_spare3 i1b (144) to i_spare3 i1b (142)

i_aer4_msf changed description

i_rdu added description

i_Surface_wind changed description

i_Surface_wdir changed description

GLA12

i_satCorrFlg, changed description and the PDF file to reflect added descriptions.

i_DEM_hires_src & i_DEM_hires_elv, updated description and PDF file

i_DEM_elv, changed description.

i_satNrgCorr, changed units to 0.1fJ, scale to 1.0d-17

i_satPwdCorr, changed units to 0.01ns, scale to 0.01

i_msRngCorr, added description

i_msCorrFlg, added description

GLA13

i_satCorrFlg, changed description and the PDF file to reflect added descriptions.

i_DEM_hires_src & i_DEM_hires_elv, updated description and PDF file

i_DEM_elv, changed description.

i_satNrgCorr, changed units to 0.1fJ, scale to 1.0d-17

i_satPwdCorr, changed units to 0.01ns, scale to 0.01

i_msRngCorr, added description

i_msCorrFlg, added description

GLA14

i_satCorrFlg, changed description and the PDF file to reflect added descriptions.

i_DEM_hires_src & i_DEM_hires_elv, updated description and PDF file

i_DEM_elv, changed description.

i_satNrgCorr, changed units to 0.1fJ, scale to 1.0d-17

i_satPwdCorr, changed units to 0.01ns, scale to 0.01

i_msRngCorr, added description

i_msCorrFlg, added description

GLA15

i_satCorrFlg, changed description and the PDF file to reflect added descriptions.

i_DEM_elv, changed description.

i_satNrgCorr, changed units to 0.1fJ, scale to 1.0d-17

i_satPwdCorr, changed units to 0.01ns, scale to 0.01

i_msRngCorr, added description

i_msCorrFlg, added description

Known Problems

The atmospheric correction to range for multiple-scattering (i_erd) is not correct. The problem is the result of an error in the ANC38 file that supplies the data to compute the delay.

The estimates of slope and roughness on the elevation products are not correct. The equations in this release do not use the real laser footprint information and do not correct for pointing.

The Transmit flag i_TxFlg may not be set correctly

The following products parameters are not filled/defined:

i_satNrgCorr
i_satPwdCorr
i_LRg_SourceFt
i_MRg_SourceFt
i_HRg_SourceFt
i_LRir_SourceFt
i_MRir_SourceFt
i_cld_ir_OD
i_Aer_ir_OD
i_Aer_b20_prop
i_PBL_prop
Aer_ir_ODFlg
Cld_ir_ODFlg
FRir_ODFlg
i_msRngCorr
i_msCorrFlg

The STRM track files will be improved and updated to version 2.

The attitude flag on GLA06,12-15 has been reported to be in error.

Release Information

The ClearCase label for this release is RELEASE_5.2.

Products generated by this software will be labeled as Release 26 by SDMS.

The release date is January 31, 2006.

Version numbers have been updated to “V5.2 Jan 2006".

This should be verified during operation by checking the version information in the appropriate ANC06 files.

SMDS Impact

The distribution tarfile is on glasdev.wff.nasa.gov at the following location:

```
/glasdev1/v5/dist/gsas_v5.2.tar.Z.
```

Bundle Changes

QA keywords in the GLAS_Meta control file are now supported (see Mantis 520).

ANC File Changes

ANC07s were updated

ANC45s were updated.

ANC01 now has 11 granules instead of 5.

ANC52 has been updated

ANC30 and ANC31 are now time-dependent.

ANC25 has been updated to support the 2005/2006 leap second.

Detailed Change Notes

0002228: Re-fix 1977

Fixed a bad merge which negated changes made in PR1977. This caused the POD and PAD used for GLA12/14 to be the same as used on GLA05. The problem reared its head when a new POD/PAD was used during elevation processing. The POD/PAD on GLA06, for example, was updated with the new POD/PAD, but the information on GLA12/14 was not. This problem is now fixed.

0002224: Change i_maxNdxNSat2 to 0 in ANC07_04

Changed i_maxNdxNSat2 to 0 in ANC07_04

0002223: GLA08 & GLA09 Specific humidity descrip chg

GLA08 & GLA09 specific humidity description was changed as requested.

0002222: GLA10 & GLA11 flag description changes

Changed several GLA10/11 flag descriptions including: i_cld1_ext_prof, i_cld1_sval1, i_aer4_sval1, i_cld1_sval_uf, i_aer4_sval_uf, i_cld1_bs_flag, i_cld1_ext_flag, i_aer4_bs_flag, i_aer4_ext_flag, i_aer4_msf, i_rdu.

0002219: Invalid Values of Ground Detection Height in GLA09 Product

A flaw has been corrected in GLA09 processing that permitted invalid values to be occassionally be entered into the d_FRcld_grd parameter rather than the expected physical value or flag value.

0002218: Full Resolution Cloud Height Documentation Error

The error in the documentation for the GLA09 parameters i_FRcld_bot and i_FR_cld_top was corrected.

0002216: Change NOT to ~ in QAB_ReadControlFile.pro

Binary NOT changed to logical NOT in two modules. Fixed a problem running QABrowse during acceptance testing.

0002213: GLA09 Ground Height Problem

The flag value used for ground detection heights that are in the GLA09 product variables d_FRcld_grd, d_MRcld_grd, and d_HRcld_grd have been changed from -127 to -1270. The previous value could have been mistaken for a physically possible value, and it was inappropriately changed to -130 by the internal scaling routines.

0002211: atm_anc fails due to unconnected unit problem

Corrected an error introduced into atm_anc by work done on item #2132.

0002210: i_satRngCorr in GLA06,12-15 scale was incorrectly changed

Reverted information for i_satRngCorr which was incorrectly changed in the 5.2 development database.

0002206: Option in Alternate fit to stop combining initial Peaks

Added l_stopAt6 to anc07_0004, anc07_wf_mod, const_wf_mod, and W_FunctionalFt_mod. When this flag is set, the combining peaks stops in W_Estimates and W_EstNew when the number of peaks is less than or equal to the maximum number of fitted peaks (6 for alt, or 2 for std), even if some of the remaining peaks are too close to other peaks or too small. Alternate fit is set to stop combining and standard fit is set to continue combining.

0002203: Distribute updated ANC25 file to development team

A new ANC25 file (anc25_001_20051231_000000_01_0000.dat) has been created to include the extra 2005/2006 leap second.

0002201: Update ANC45s for new VersionID and Metadata keywords

The anc45 .dat files were updated to show the latest VersionID - 26.

0002200: Possible i_satNdx inconsistencies?

i_satNdx is initialized to invalid_i4b (converted to invalid_i1b=127 on the product). If the waveform is valid, then it can have a value from 0 to 126.

0002196: Load Tides not being applied correctly in the elevation manager

GSAS v4.3-5.1 applied the tide corrections in reverse order within the 40 elevations. The tide corrections are now applied in the correct order.

0002193: QAPG Should Be Changed After Mantis 2149 Is Merged

QAPG was modified to compute the histograms of the number of iterations for GLA05. The QAP version was updated. The IDL code was changed to be consistent with these updates. New QAP version = 4.6.

002192: GLA09 Ground Height Documentation Error

Changed i_FRcld_grd description ('a value of -880 indicates' TO 'a value of -127 indicates') and minimum value to -127.

Changed i_HRcld_grd, i_MRcld_gdr, & i_LRcld_grd description ('a value of -880 indicates' TO 'a value of -127 indicates') and minimum product value to -127.

0002191: 1064 Medium Resolution Cloud Problem

This issue turned out to be caused by problems addressed in Mantis 2190. Steve Palm has verified that with correction of that problem, this one has also been eliminated.

0002190: GLA09 Documentation Error

Corrections were made to the software which packs and unpacks the MRir_Flag in products GLA09 and GLA11. The product values and documentation now match.

0002182: Wrong units for i_sat_NrgCorr and i_sat_PwdCorr

For i_satNrgCorr: changed units to 0.01fJ; scale to 1.0d-17

For i_satPwdCorr: changed units to 0.01ns; scale to 0.01

0002181: Create pdf description file for i_satCorrFlag

Created a new PDF description file for i_satCorrFlag, the saturation correction flag.

0002180: change pdf file for i_DEM_hires_src flag

Corrected the PDF description of i_DEM_hires_src in GLA06, 12-14 to reflect that it is an element of GLA06, 12-14.

0002179: i_DEM_elv should be referenced to the TOPEX/Poseidon ellipsoid

Elevation at the footprint location from the SRTM30 (GTOPO30 + SRTM) Digital Elevation Model (DEM). The reference frame for the the DEM elevation was changed to the TOPEX/ Poseidon ellipsoid to make it consistent with the GLAS elevations. Previous releases had the SRTM30 elevations referenced to the egm96 geoid.Description change made to i_DEM_elv in GLA06, 12-15.

0002177: A Laser 3D atmosphere job failed with a memory fault (coredump)

A limit check on the bounds of a computed index was added to the atmosphere DEM calculations.

0002172: Alternate fit to keep last peak

Changed the pre-fitting code to keep the last peak.

0002171: Define saturation range correction for all gains/energies

Updated the ANC52 table of saturation range corrections to contain definitions for all gain/energy combinations. Updated i_satCorrFlg description and the PDF description.

0002170: Waveform alternate fit change to method of initial estimates for saturated waveform

A section of code designed to better estimate saturated peak parameters is skipped if the saturation index is less than anc07(alt or std)%i_maxNdxNSat.

0002164: A GLA05 browse job (Laser 2A, Rel 24) failed with a TIME HEADER MISSING FROM INPUT FILE error

Added check for valid time in setting summary packet start time in W_BuildTrkStats.

0002153: i_satNdx Using Wrong Max Value In GLAxx_prod_mod

Changed maximum value of i_satNdx to 126.

0002150: Summary Record Missing From QAP05

Added check for valid time in setting summary packet start time in W_BuildTrkStats.

0002149: Add number of iterations to GLA05

Added the number of iterations (i_numIters) for both std and alt fit to the GLA05 product.

0002148: PDF Cloud Flag Descriptions for GLA09

Corrected availability flag description for i_LRCL_Flag and i_MRCL_Flag in GLA09.

TO

af = availability flag: Tells how many cloud layers were found at this resolution from the 532 nm channel.

value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for, but not detected.

0002132: Additionl Parameters to Extract from MET files

Additional meteorological data for the planetary boundary layer height, specific humidity temperature 2 meters above ground level, and total cloud cover have been added to GLA08 and GLA09.

0002127: Missing parameter on GLA11

Added i_Aer_ir_layflag to GLA11 as a pass-thru from GLA08. Decreased size of spare3 to 142 bytes to compensate.

0002124: Documentation for i_DEM_hires_elv

Changed the product database to reflect pass-thru GLA06,12,13,14. Added a new description to the variable i_DEM_hires_elv as requested. Made changes for the variable i_DEM_hires_elv description and the PDF for i_DEM_hires_src for bit value 1.

0002112: Update W_CalcNoise

Added compression to W_CalcNoise. Added iMinNG2useTr & iNGates2useTr to anc07_0004, anc07_wf_mod, and const_wf_mod.

0002102: assignment of wind speed and direction

Additional meteorological data for the surface wind speed and surface wind direction have been added to products GLA07-11, and 15.

0002098: different values of absolute zero

All GSAS code was reviewed in order to use an consistent version of absolute zero values (-273.15 degrees Kelvin). In some cases -273.16 was previously used.

0002053: Documentation of Product Header Fields

GSAS Standard Data Product Specifications Level 1 and 2 Appendix A list the header elements.

0001965: Alternate Peak always keeping 6 peaks

Added code after the fitting process, to throw out peaks with zero amplitude, and changed D_WFFITSDEVTHR1 from 0.00001 to 0.001

0000520: Data quality flags needed in metadata

Modified GLAS_Meta to parse control file lines in order to update metadata QA parameters in the .MET files. The control file lines are defined as follows:

QA_DATA=GLA05_017_2107_002_1291_2_01_0001.MET RANGE P null null null null

The format is file_name base_param_name autoqa_flag operqa_flag sciqa_flag pctmissing pctoob pctcloud. "null" designates missing or non-applicable values. For the flags, 'P' is pass and 'F' is fail. pctmissing pctoob pctcloud must be numeric.

The base_param_names are defined in the associated Mantis item. The update algorithm works like this:

The control information is parsed and saved in a control data structure. The information contained in the ANC45 and product headers is merged into an meta data structure. That meta data structure is searched for all entries of type 'Parameter'. Once an individual

parameter is found in the meta structure, the control structure is searched for an instance of that Parameter and the appropriate input granule. If the control information is found, the meta structure is updated with the values from control. The parameter information (updated from control -OR- not) is written to the corresponding granule .MET file.

Changed Files:

```
./data/anc07_001_01_0000.dat
./data/anc07_001_01_0004.dat
./data/anc45_001_01_0001.dat
./data/anc45_001_01_0002.dat
./data/anc45_001_01_0003.dat
./data/anc45_001_01_0004.dat
./data/anc45_001_01_0005.dat
./data/anc45_001_01_0006.dat
./data/anc45_001_01_0007.dat
./data/anc45_001_01_0008.dat
./data/anc45_001_01_0009.dat
./data/anc45_001_01_0010.dat
./data/anc45_001_01_0011.dat
./data/anc45_001_01_0012.dat
./data/anc45_001_01_0013.dat
./data/anc45_001_01_0014.dat
./data/anc45_001_01_0015.dat
./idl/qa_browse/browse/qab_readcntlfile.pro
./idl/qa_browse/compare/qapc_readcntlfile.pro
./idl/qa_browse/read/qapread.pro
./idl/qa_browse/util
./src/atm_anc/A_open_met_mod.f90
./src/atmosphere/common/A_buff_data_mod.f90
./src/atmosphere/common/A_types_mod.f90
./src/atmosphere/interp/A_interp_met_mod.f90
./src/atmosphere/layers/A_cld_det_mod.f90
./src/atmosphere/layers/A_cld_grd_det_mod.f90
./src/atmosphere/layers/A_cld_lay_1064_40hz_mod.f90
./src/atmosphere/layers/A_lays_1064_mod.f90
./src/atmosphere/layers/A_pbl_lay_mod.f90
./src/atmosphere/opt_props/A_aer_opt_prop_mod.f90
./src/atmosphere/opt_props/A_cld_opt_prop_mod.f90
./src/atmosphere/opt_props/A_opt_thin_mod.f90
./src/atmosphere/QA/QAP09_mod.f90
./src/common_libs/anc_lib/anc01_met_mod.f90
./src/common_libs/anc_lib/anc07_wf_mod.f90
./src/common_libs/err_lib/ErrorBoot_mod.f90
./src/common_libs/exec_lib/fCntl_mod.f90
./src/common_libs/exec_lib/ReadAnc_mod.f90
./src/common_libs/exec_lib/ReadData_mod.f90
./src/common_libs/platform_lib/const_atm_mod.f90
./src/common_libs/platform_lib/const_glob_mod.f90
./src/common_libs/platform_lib/const_util_mod.f90
./src/common_libs/platform_lib/const_wf_mod.f90
./src/common_libs/platform_lib/const_wf_mod.f90
./src/common_libs/prod_lib/GLA05_alg_mod.f90
./src/common_libs/prod_lib/GLA05_flags_mod.f90
./src/common_libs/prod_lib/GLA05_print_mod.f90
./src/common_libs/prod_lib/GLA05_prod_mod.f90
```

```
./src/common_libs/prod_lib/GLA05_scal_mod.f90
./src/common_libs/prod_lib/GLA06_scal_mod.f90
./src/common_libs/prod_lib/GLA08_alg_mod.f90
./src/common_libs/prod_lib/GLA08_print_mod.f90
./src/common_libs/prod_lib/GLA08_prod_mod.f90
./src/common_libs/prod_lib/GLA08_scal_mod.f90
./src/common_libs/prod_lib/GLA09_alg_mod.f90
./src/common_libs/prod_lib/GLA09_flags_mod.f90
./src/common_libs/prod_lib/GLA09_print_mod.f90
./src/common_libs/prod_lib/GLA09_prod_mod.f90
./src/common_libs/prod_lib/GLA09_scal_mod.f90
./src/common_libs/prod_lib/GLA11_alg_mod.f90
./src/common_libs/prod_lib/GLA11_flags_mod.f90
./src/common_libs/prod_lib/GLA11_print_mod.f90
./src/common_libs/prod_lib/GLA11_prod_mod.f90
./src/common_libs/prod_lib/GLA11_scal_mod.f90
./src/common_libs/prod_lib/GLA12_scal_mod.f90
./src/common_libs/prod_lib/GLA13_scal_mod.f90
./src/common_libs/prod_lib/GLA14_scal_mod.f90
./src/common_libs/prod_lib/GLA15_scal_mod.f90
./src/common_libs/prod_lib/qap_version_mod.f90
./src/glas_alt/Elev_Support_mod.f90
./src/glas_alt/ElevMgr_mod.f90
./src/glas_alt/WFMgr_mod.f90
./src/glas_atm/AtmMgr_mod.f90
./src/glas_atm/GetControl_mod.f90
./src/glas_meta
./src/glas_meta/GetControl_mod.f90
./src/glas_meta/GLAS_Meta.f90
./src/glas_meta/Makefile
./src/glas_meta/MetaQA_mod.f90
./src/glas_meta/WriteMetaFile_mod.f90
./src/met_util/M_read_control_mod.f90
./src/met_util/met_util.f90
./src/met_util/SDMS_met_script
./src/prod_util/product_test/gla04_minmax_mod.f90
./src/prod_util/product_test/gla05_minmax_mod.f90
./src/prod_util/product_test/gla06_minmax_mod.f90
./src/prod_util/product_test/gla12_minmax_mod.f90
./src/prod_util/product_test/gla13_minmax_mod.f90
./src/prod_util/product_test/gla14_minmax_mod.f90
./src/prod_util/product_test/gla15_minmax_mod.f90
./src/prod_util/scantime/scantime.f90
./src/qapg/qapg_gla05_mod.f90
./src/qapg/qapg_gla05_sum.f90
./src/wf_lib/W_Assess_mod.f90
./src/wf_lib/W_CreQAStats_mod.f90
./src/wf_lib/W_FunctionalFt_mod.f90
```